

EXHIBIT E10

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

CAROLYN WEIRICK and
ELVIRA GRACIELA
ESCUDERO LORA,
Plaintiffs,

CASE NO.

vs. JCCP 4674/BC656425

BRENNNTAG NORTH
AMERICA, INC. (Sued
individually and as
successor-in-interest
to MINERAL PIGMENT
SOLUTIONS, INC. and as
successor-in-interest
to WHITTAKER CLARK &
DANIELS, INC.), et
al.,

Defendants.

— — —

Deposition of WILLIAM E. LONGO Ph.D.,

Taken by Matthew L. Bush,

Before Jennifer D. Hamon,
Certified Court Reporter,

At the Offices of Atlanta Reporters,
Johns Creek, Georgia,

On Wednesday, April 17, 2019,
Beginning at 11:07 a.m. and ending at 3:28 p.m.

— — —

1 APPEARANCES OF COUNSEL

2 For the Plaintiff:

3 JAY E. STUEMKE
4 Simon Greenstone Panatier
5 Suite 3400
6 1201 Elm Street
7 Dallas, TX 75270
8 212.276.7680

9 For the Defendant:

10 MATTHEW L. BUSH
11 Orrick Herrington & Sutcliffe LLP
12 51 West 52nd Street
13 New York, NY 10019
14 212.506.5000

William E. Longo, Ph.D.

Weirick, et al. vs Brenntag North America, et al.

April 17, 2019

25 (Pages 85 to 88)

<p style="text-align: center;">85</p> <p>1 because you're saying in this weight, in this 2 much smaller weight, here's the concentration. 3 But that's not appropriate. You have to work it 4 back to the original amount you started with. 5 Q It's 1:10. I wasn't sure if you 6 wanted to take a break. I was going to move to 7 something new, but we can keep going if that's 8 okay with both of you. 9 A Just get a cup of coffee and take a 10 short break. 11 MR. BUSH: Okay. Great. 12 (Proceedings in recess, 1:11 p.m. to 13 1:31 p.m.) 14 (Whereupon a document was identified 15 as Defendant's Exhibit 10.) 16 Q What I'm going to mark as Exhibit 10 17 is your March 11th, 2018, report. And I'm going 18 to direct your attention to page ten. On page 19 ten, there's a bottle M66514-001 that you report 20 has 24,700 fibers per gram. Is that the bottle 21 that you received from Ms. Weirick in this case? 22 A It is. 23 Q And if you were to figure out what her 24 airborne exposure was and fibers per cc from an 25 application, how might you go about -- of that</p>	<p style="text-align: center;">87</p> <p>1 15 million -- let me just look at what exactly 2 the number is. 15,000,100. It's a factor of 63 3 between the difference between the two. And if 4 you look at the average exposure in the 5 Below-The-Waist, I think the average personal 6 exposure is 2.1 fibers per cc. It would give you 7 an exposure of 0.03 for that particular bottle. 8 Q 0.03 fibers per cc? 9 A Correct. 10 Q And -- 11 A If we go to the baby study, which was 12 4 million, the average exposure for the person 13 doing the work was approximately -- 14 Q I believe it's .57, but you can check 15 me on that, fibers per cc. 16 A So 4 million divided by 240,000 is a 17 factor of 17. So .57 divided by 17 is .03. 18 Wasn't that what I said last time? 19 Q I believe it is. 20 MR. STUEMK: Math is funny sometimes. 21 Q And for the record, you were using a 22 calculator on your iPhone for that; correct? 23 A Correct. This is data. It's how I've 24 done it before in deposition. 25 Q And so are those the only two things</p>
<p style="text-align: center;">86</p> <p>1 bottle, how might you go about doing that? 2 A From that 24,700? 3 Q Yes. 4 A You know, interesting enough, last 5 night I just took a look at that report and took 6 a look at the calculations that we've been going 7 over, and the calculations are off by a factor of 8 ten. If you look at the count sheet, it should 9 be 247,000 instead of 24,700. 10 Q Do you have the count sheet with you? 11 A I do not. I thought you'd have it. I 12 just wanted to check one more time because there 13 was -- it looks like there was a glitch. Instead 14 of -- it was off by -- the actual weight was off 15 by a factor of ten. 16 Q And when did you figure this out? 17 A I looked at it last night when I was 18 getting ready, really late. It was -- 19 Q Well, assuming that the bottle is 20 247,000 fibers per gram that you received from 21 Ms. Weirick, how would you go about figuring out 22 her airborne exposure from -- in fibers per cc 23 from an application of that bottle? 24 A Assuming the same efficiency, say, for 25 Below-The-Waist of 14 -- I think it's</p>	<p style="text-align: center;">88</p> <p>1 you would consider, the Below-The-Waist study and 2 the diapering study, in order to reach that 3 calculation? 4 A Yes. 5 Q And we already discussed that the OSHA 6 eight-hour time-weighted average is .1 fibers per 7 cc; correct? 8 A Correct. I don't think I've ever 9 stated that these levels would be over an OSHA 10 PEL. 11 Q But they in fact are under the OSHA 12 PEL? 13 A Correct, they are. 14 Q And the OSHA PEL is .1 for an 15 eight-hour time period; correct? 16 A Correct. 17 Q So what that means is to really -- if 18 we really wanted to make this comparison, it 19 would be as if someone were exposed to baby 20 powder for eight hours a day compared to -- for 21 eight hours compared to the OSHA PEL of .1 fibers 22 per cc; correct? 23 A That's correct. 24 Q What OSHA's basically saying is 25 someone can sit in a room with a .1 fiber cc</p>

<p style="text-align: right;">89</p> <p>1 concentration for eight hours, and that's within 2 their regulations; correct?</p> <p>3 A That's correct.</p> <p>4 Q And you've already testified that 5 someone applying baby powder would do it for 6 roughly one to four minute -- or roughly 30 7 seconds to four minutes; correct?</p> <p>8 A Correct. For the application portion 9 of it, that's correct.</p> <p>10 Q And could you do the same thing with 11 any of the MDL bottles?</p> <p>12 A Yes.</p> <p>13 Q Have you run any data on what the mean 14 or median MDL bottle is?</p> <p>15 A I have not.</p> <p>16 Q You aren't curious what the average 17 bottle was in any metric?</p> <p>18 A I don't know curious or not curious. 19 I just haven't gone through the whole metric of 20 all the MDL bottles.</p> <p>21 (Whereupon a document was identified 22 as Defendant's Exhibit 11.)</p> <p>23 Q What I'm marking as Exhibit 11 I'll 24 represent to you is a list of your -- the fibers 25 per gram you listed in your report for your -- in</p>	<p style="text-align: right;">91</p> <p>1 (Whereupon a document was identified 2 as Defendant's Exhibit 12.)</p> <p>3 Q And let me then show you what's marked 4 as Exhibit 12. This is 40 CFR 763.90, which are 5 part of the AHERA regulations. Are you familiar 6 with the AHERA regulations?</p> <p>7 A I am.</p> <p>8 Q And if you look at page three, there's 9 a subsection 5. Do you see that towards the 10 bottom of the page?</p> <p>11 A I do.</p> <p>12 Q And this section discusses a 13 concentration of .01 fibers per cc; correct?</p> <p>14 A Correct.</p> <p>15 Q And you've done testing under AHERA 16 outside of this litigation; correct?</p> <p>17 A I have.</p> <p>18 Q And part of that testing was to 19 determine if the concentration of asbestos in the 20 samples you were given would exceed this limit; 21 correct?</p> <p>22 A Correct.</p> <p>23 Q And AHERA, one of the things it's 24 designed for is regulations regarding abating 25 schools; correct?</p>
<p style="text-align: right;">90</p> <p>1 your MDL report for your U.S. bottles. And so if 2 this list is accurate, then the way to figure out 3 the median bottle is just to take the middle one; 4 correct?</p> <p>5 A If you're going to calculate the 6 median, that's correct.</p> <p>7 Q And so if this list is accurate, the 8 middle bottle would just be the one that I've 9 highlighted, which is 45D, which is 9,000 fibers 10 per gram; correct?</p> <p>11 A Correct.</p> <p>12 Q So I see you've already taken out your 13 calculator. So are you figuring out for me the 14 fiber per cc airborne exposure from use of that 15 bottle?</p> <p>16 A I just want to get the numbers right. 17 That would be 0.002 fibers per cc, OSHA fibers.</p> <p>18 Q And the way you calculated that is you 19 looked at the ratio of fibers per grams to fibers 20 per cc in the Below-The-Waist study and the ratio 21 of fibers per gram to fibers per cc in the 22 diapering study and used those to extrapolate 23 what the fibers per cc would be from a bottle 24 with 9,000 fibers per gram; correct?</p> <p>25 A Correct.</p>	<p style="text-align: right;">92</p> <p>1 A Correct.</p> <p>2 Q And so under these regulations an 3 abatement is considered complete if you test the 4 sample and it has less than .01 fibers per cc; is 5 that right?</p> <p>6 A That's correct.</p> <p>7 Q And the .002 fiber per cc we 8 calculated from a 9,000 fiber per gram bottle is 9 less than the .01 fiber per cc that we just 10 discussed; correct?</p> <p>11 A That is correct. But you really can't 12 compare the two unless you were to go in and -- 13 when they do this analysis, they go in with a 14 hundred-mile-an-hour leaf blower and blow all the 15 material around and sample for a much longer 16 period of time because you have to have a 17 detection limit. So you're really comparing 18 apples to oranges.</p> <p>19 You would have to take this 20 material -- instead of just doing an exposure, 21 it's putting the material down on the ground, say 22 four grams like Below-The-Waist, put air samples 23 up and continuously blow the air inside that room 24 with a leaf blower which would constantly keep it 25 getting re-trained and re-trained.</p>

<p style="text-align: center;">93</p> <p>1 So a lot of folks like to point to the 2 AHERA regulations, this is the PCM, but they're 3 not taking into full account on how those samples 4 are taken.</p> <p>5 Q Do you think that when this 6 methodology is used under AHERA, the sample 7 represents the concentration of asbestos that is 8 in the affected area?</p> <p>9 A Underaggressive air sampling. So 10 think about it as we had done the Below-The-Waist 11 study. We have to take a minimum of 500. In 12 order to get detection limits, you have to get to 13 a certain detection limit, and we're in there 14 taking an air sample and then blowing it with a 15 leaf blower to keep it all re-entrained because 16 they're looking not for just in the air but 17 what's on the surfaces, what's maybe in the 18 cracks and crevices.</p> <p>19 So we would be talking about a very 20 different number, in my opinion, with the 21 Johnson & Johnson stuff. So you would have to 22 redo the study and then vacate the area and then 23 use a leaf blower in order to get what's an AHERA 24 air sample.</p> <p>25 Q So when you're testing under AHERA,</p>	<p style="text-align: center;">95</p> <p>1 because you're doing this leaf-blowing activity 2 that would blow into the air things that are on 3 the floor?</p> <p>4 A I don't know about naturally, but 5 after time, you know, all this material is going 6 to settle out. It's settling out during the five 7 minutes we take the air sample. If you're going 8 to compare to AHERA and say, well, this number is 9 lower than school kids being allowed back into a 10 space, it's not measuring the same thing.</p> <p>11 Q And I'm sorry. I didn't mean to 12 interrupt you.</p> <p>13 A Yeah. You're not measuring the same 14 thing. You're not measuring what's on the 15 surface and keeping the material re-entrained for 16 a set amount of time.</p> <p>17 Q What did you mean by it's -- you 18 talked about settlement, if you'll just explain 19 more what you meant by that.</p> <p>20 A Well, if you look at the video and you 21 look at our results, you can see that the 22 surfaces are contaminated. If you want to 23 compare to AHERA, you have to re-entrain the 24 material that gets on the surfaces so you can 25 compare apples to apples.</p>
<p style="text-align: center;">94</p> <p>1 you're actually make -- the test is conservative 2 because you're testing the air but blowing 3 asbestos that might be in the nooks and crannies 4 into the air to test; is that right?</p> <p>5 A Well, I don't know where the 6 conservative part comes in. But you're 7 air-blowing during the entire -- during the 8 testing period for a certain amount of time.</p> <p>9 So if you look at the video, you can 10 see -- for example, in the baby video, if you 11 look at the analysis of postactivity wipe 12 samples, fabric samples, wipe samples 13 postactivity above the head, you have 7,000 14 tremolite structures per centimeter squared. For 15 postactivity below the feet, you have 4,600 16 structures per centimeter squared. All that 17 would become re-entrained during the sampling 18 period.</p> <p>19 Q So when you're doing the AHERA method, 20 the sample you're testing actually would have 21 more than what's just in the air, would -- strike 22 that.</p> <p>23 When you're doing the AHERA 24 methodology, you're testing a sample that has 25 more than what would just be naturally in the air</p>	<p style="text-align: center;">96</p> <p>1 Q So you're saying the settlement. You 2 just mean it's going to land on the ground?</p> <p>3 A Settling on the surface, or, you know, 4 when the powder is applied, it's getting on other 5 surfaces during that five-minute period. And 6 there's no aggressive air sampling going on. 7 It's just air sampling, passive air sampling, 8 meaning what's in that immediate area during that 9 five minutes. It doesn't take into account what 10 gets on the changing table or what gets on the 11 clothing or what gets on the floor during that 12 time frame or on the walls.</p> <p>13 Q And do you think that when you do an 14 AHERA -- the AHERA method that it accurately -- 15 the sample you test and the fibers per cc result 16 is an accurate representation of the fibers per 17 cc in the affected area?</p> <p>18 A Yes.</p> <p>19 Q And in your Below-The-Waist study, it 20 is your opinion that the fibers per cc that you 21 resulted in is an accurate representation of the 22 concentration in the area you did the study; 23 correct?</p> <p>24 A Yes, in the air at that particular 25 point over the five minutes. But no, it's not</p>

<p style="text-align: center;">97</p> <p>1 taking into account what's getting in the cracks 2 and crevices or what's landed on the surface 3 immediately and is on the surface.</p> <p>4 That's why AHERA does aggressive air 5 sampling so it accounts for any potential 6 re-entrainment that might happen, so all the 7 asbestos that has been released during the 8 abatement, not only what's in the air still but 9 what's in the cracks and crevices or on the 10 surfaces or on the floor or on the walls of the 11 abatement area.</p> <p>12 In order to compare that to the 13 Below-The-Waist, you would need to do the same 14 type of air sampling.</p> <p>15 (Whereupon off-the-record discussions 16 ensued.)</p> <p>17 (Whereupon a document was identified 18 as Defendant's Exhibit 13.)</p> <p>19 Q What I'm going to mark as Exhibit 13 20 are your diffraction Verifications. Does this 21 look familiar to you?</p> <p>22 A Yes.</p> <p>23 MR. STUEMKE: This comes from the 24 backup data to the MDL report?</p> <p>25 MR. BUSH: Yes. I was about to say</p>	<p style="text-align: center;">99</p> <p>1 time done these diffraction verifications; 2 correct?</p> <p>3 A In the initial MDL report, we didn't 4 do the printout of the verification. It's 5 verified every time we take a diffraction pattern 6 because it comes up on the computer and it's 7 instantly measured. Then printing it out to show 8 what we saw on the computer, it puts the date on 9 it, such as this one, date verified, 10 November 19th, '18, but date of photo is 11 10-29-2018.</p> <p>12 Q When you determine the results of your 13 diffraction analysis, do you use the data that's 14 in this Exhibit 13?</p> <p>15 A Yes. When the photograph is taken of 16 the diffraction pattern or is captured 17 electronically, it's run right at that moment to 18 verify it when the analyst is sitting there. To 19 print out that verification, it puts the date on 20 the day it's printed out.</p> <p>21 Q And it's called a verification because 22 you had already made a determination of what 23 material it was before running these diffraction 24 analyses; is that right?</p> <p>25 A Yes and no.</p>
<p style="text-align: center;">98</p> <p>1 that.</p> <p>2 Q This is part of the backup to the MDL 3 report, correct, Dr. Longo?</p> <p>4 A That is correct.</p> <p>5 Q So let's just look at the very first 6 page, which is MAS job number M68503-001-001. 7 Can you just explain to me what that -- for the 8 job number, can you just explain to me what each 9 section of that means? Because usually you only 10 have one dash in your sample IDs.</p> <p>11 A Well, it's sample 001 and would be the 12 first structure.</p> <p>13 Q The first structure. And M68503 would 14 be the same container? Let me rephrase.</p> <p>15 If there were a sample M68503-002, 16 would that be another sample from the same 17 container as this one?</p> <p>18 A No.</p> <p>19 Q No?</p> <p>20 A 002 would be a different container.</p> <p>21 Q Totally different bottle?</p> <p>22 A Yes.</p> <p>23 Q And I just want to situate us for what 24 you did in your report. In your initial MDL 25 report, you did not do -- you had not at that</p>	<p style="text-align: center;">100</p> <p>1 Q Okay. Let's start with yes.</p> <p>2 A It's run immediately and stored on the 3 computer, and then it is printed out when they 4 ask for them. We give the diffraction patterns 5 right with the report. But then to print out the 6 verification, it gives the date of the 7 verification printout, not the date it's actually 8 run.</p> <p>9 Q So does somebody look at these numbers 10 and determine -- we're talking about the first 11 page. Does somebody look at the spacing, which 12 in this case is 5.23, and determine that that is 13 anthophyllite?</p> <p>14 A Well, not just this. It's looking at 15 the -- in this case, we're doing two diffraction 16 patterns as well as the chemistry as well as the 17 morphology. It all goes together. So the 18 analyst, at this particular point, when he takes 19 the diffraction pattern electronically and it 20 goes up onto the computer, then the computer 21 measures the -- it's done where the computer 22 measures the d-spacing, in this particular case, 23 left to right, and then verifies, okay, it's in 24 the range of what anthophyllite ought to be.</p> <p>25 Q So when it says anthophyllite here</p>

William E. Longo, Ph.D.

Weirick, et al. vs Brenntag North America, et al.

April 17, 2019

29 (Pages 101 to 104)

<p style="text-align: center;">101</p> <p>1 under the type of amphibole diffraction verified, 2 is that something an analyst types in, or is that 3 something the computer does automatically? 4 A The analyst puts the information into 5 the computer on what he determines to be at that 6 point. The computer is only doing the d-spacing. 7 It's not making a decision on what amphibole it 8 is. 9 Q So the computer does not say 5.23 10 d-spacing, therefore, anthophyllite? 11 A No. 12 Q That's an analyst making that 13 decision? 14 A Correct. 15 Q And so how do you know that this 16 d-spacing is left to right? 17 A These are the AD spacings, as I 18 recall, so it's the rows going across, as I 19 remember correctly. 20 Q And you said you took two diffraction 21 patterns; is that right? 22 A If you go to the second page -- 23 Q Okay. 24 A -- you see M68503-001-001, diffraction 25 two. This is to determine to make sure that this</p>	<p style="text-align: center;">103</p> <p>1 Q And that's within the range of 2 grunerite that's the first one listed in that 3 table; correct? 4 A Correct. 5 Q And within the range of actinolite; 6 correct? 7 A It's in the range of all of them. 8 Q It's in the range of all of them; 9 correct? 10 A Correct. 11 Q So how does this diffraction pattern 12 verification help you determine which of those 13 five minerals it is? 14 A Well, you don't use just the 15 diffraction pattern. You use also the chemistry. 16 Grunerite, actinolite, tremolite, crocidolite are 17 completely different EDXA patterns. So you 18 couple that with the diffraction so you can 19 eliminate things like antigorite, which has a 20 d-spacing I think of approximately nine or so. 21 So it's eliminating the nonregulated 22 asbestos amphiboles. It's not chrysotile, so the 23 chrysotile one's different. And with 24 anthophyllite, you just want to make sure you're 25 not looking at fibrous talc because you can get</p>
<p style="text-align: center;">102</p> <p>1 is not a talc fiber because as per the -- it 2 actually states it in the 22262-1. Rotating a 3 talc fiber on the goniometer, the pattern won't 4 change until you -- when you get to another 5 orientation. 6 With the anthophyllite, when you get 7 to a different orientation, the diffraction 8 pattern changes. So that's how we eliminate 9 fibrous talc. 10 Q Did you always take two diffraction 11 patterns for all your analyses? 12 A All the MDL analysis -- 13 Q That's what I meant, all the MDL 14 analysis. 15 A All the MDL analysis should have two 16 diffraction patterns. 17 Q And are those at different zone axis 18 orientations? 19 A Different orientations may not be 20 exactly on a zone axis, no. We don't typically 21 take zone axis diffraction patterns because it's 22 not necessary. 23 Q I want to go back to this first page. 24 The d-spacing is 5.23; correct? 25 A Correct.</p>	<p style="text-align: center;">104</p> <p>1 one reflection that's a little bit closer to 2 what -- you know, it's not the pseudohexagonal 3 pattern. 4 That's why you do the -- you rotate 5 the goniometer or the stage to get to another 6 orientation, and you can see that the diffraction 7 pattern -- if we had the data, you can look at 8 these two diffraction patterns and see that it's 9 different. You would not use d-spacing alone to 10 define a regulated asbestos. You have to do the 11 chemistry with it. 12 Q So this verification sheet on its own 13 actually doesn't help you distinguish between the 14 five types of amphiboles that are listed in the 15 chart; correct? 16 A No. And I wouldn't do that. I 17 wouldn't base my definition -- I mean, I could 18 have -- on just a d-spacing. If we weren't doing 19 EDXA, then you would have to go to the more 20 laborious zone axis diffraction patterns where 21 you would then calculate it out and determine 22 that. 23 I mean, people can use CrystalMaker 24 today. But you wouldn't just use this. This is 25 a verification for some of the look-alikes.</p>

William E. Longo, Ph.D.

Weirick, et al. vs Brenntag North America, et al.

April 17, 2019

30 (Pages 105 to 108)

<p style="text-align: right;">105</p> <p>1 Q And do you have a sense of how many 2 minerals would fit within a five percent range of 3 5.23 d-spacing?</p> <p>4 A I mean, I haven't gone through every 5 amphibole out there, nonasbestos amphibole, but 6 for the materials that are routinely found, other 7 antigorite, sepiolite. Of course, it has to be 8 fibrous. So you can start eliminating a lot of 9 the amphiboles from that.</p> <p>10 But I haven't gone through and looked 11 at every amphibole out there in the world to see 12 how close that is because we're not using just 13 d-spacing to make the determination of what's 14 present.</p> <p>15 Q Because this d-spacing actually isn't 16 very helpful because there are a lot of 17 mineral -- strike that.</p> <p>18 Because this d-spacing by itself is 19 not very helpful because there are a lot of 20 minerals that would fit within a five percent 21 range of just this d-spacing; correct?</p> <p>22 A I don't know what a lot of minerals 23 are, but certainly the ones that show up as 24 accessory minerals in some of these talc mines 25 that are -- you know, one, if it's not fibrous,</p>	<p style="text-align: right;">107</p> <p>1 pattern.</p> <p>2 Q What does that mean that it's near and 3 not a true zone axis diffraction?</p> <p>4 A Well, if you're going to zone axis 5 diffraction pattern, you have to adjust the 6 height, adjust the change in angle. So it's very 7 close. I mean, I would call it that. But when 8 it says near 101, it's just off a tad.</p> <p>9 Q If you turn to page -- these aren't 10 numbered. It's about the fourth page. It's 11 68503-001-002 with a DIFF at the end. It's the 12 fifth page of this document. It says near 111 at 13 the bottom. Are you with me?</p> <p>14 A I'm there.</p> <p>15 Q So the d-spacing in the chart in the 16 middle is 2.41; correct?</p> <p>17 A Correct.</p> <p>18 Q And if you look at the zone axis 19 spacing, you see one is 8.3, and one is the 2.41 20 that we already -- that I just mentioned just a 21 second ago; correct?</p> <p>22 A Correct.</p> <p>23 Q Now, neither of those are even close 24 to the ranges in the table; right?</p> <p>25 A That's correct.</p>
<p style="text-align: right;">106</p> <p>1 it's immaterial. You know, you've got particles 2 or chunks.</p> <p>3 Or, two, things like antigorite, 4 sepiolite, which is a serpentine, you wouldn't 5 see it anyway. And there's a few others that are 6 not even close. But, again, wouldn't be using 7 d-spacings alone for this. That's why the EDXA 8 is coupled with that.</p> <p>9 Q The spacing reference in the chart, 10 are you using the Su tables for that?</p> <p>11 A No, these are not the Su tables, as I 12 recall. Su tables is all zone axis diffraction 13 patterns. These are your standard mineral powder 14 diffraction file data book people use. I think 15 in the Su, they have 270-some individual zone 16 axes from anthophyllite.</p> <p>17 Q If we turn to the next page, there is 18 zone axis information that you see on the very 19 bottom?</p> <p>20 A Yes.</p> <p>21 Q And so it says near 101. Are you 22 using the Su tables to determine that zone axis?</p> <p>23 A I believe that's out of the mineral 24 powder diffraction file data book. And it's near 25 101. It's not a true zone axis diffraction</p>	<p style="text-align: right;">108</p> <p>1 Q And so how does this identify the 2 material as tremolite?</p> <p>3 A Well, in zone axis when you're looking 4 in different orientation, it's not only the -- 5 it's A, B, and C for your d-spacing. So if you 6 look up the d-spacings, if you're just doing -- 7 and you're not doing zone axis where you're 8 changing the orientation, it's typically the A 9 spacing that we're dealing with, not the B or the 10 C. That's just a different calculated spacing 11 because we're close to a zone axis.</p> <p>12 Q But you don't know what the C spacing 13 is on this verification page; correct?</p> <p>14 A You know, I haven't memorized them.</p> <p>15 Q Sorry. I just meant to say, there's 16 no information on this page that has any 17 d-spacing of any type within the five percent 18 range in your table; correct?</p> <p>19 A That's correct.</p> <p>20 Q And so if you don't -- you're saying, 21 well, there may be a third spacing that fits 22 within this table. Am I understanding you right?</p> <p>23 A You know, you have essentially three 24 dimensions of a crystal, so you're going either, 25 you know, across, up, or at an angle. As I</p>

<p style="text-align: center;">109</p> <p>1 recall, that's one of the calculated spacings if 2 you look at them all, especially when you're 3 doing zone axis.</p> <p>4 Q Are you saying that 2.41 is one of the 5 spacings for, in this case, tremolite?</p> <p>6 A That's correct. Because of the zone 7 axis, you're changing the orientation of it.</p> <p>8 Q And so how would you describe a zone 9 axis orientation?</p> <p>10 A Well, you have to go back to Miller 11 indices. And if you take the X, Y, and Z where 12 it is plotted on the distance of the face of the 13 crystals -- so 100 means it's the h, k, and l, 14 the h distance, the k and l. H is one. Hk would 15 be zero. So it's sort of at an angle in that 16 particular face of the zone axis versus a 17 non-zone axis which does not have it right on an 18 orientation.</p> <p>19 Q If you turn to page two of what we're 20 looking at, the d-spacing in the chart in the 21 middle is 21.2; right?</p> <p>22 A Correct.</p> <p>23 Q And this time it doesn't match up to 24 either the d-spacing in the hk -- the first 25 d-spacing or the second d-spacing, which are 8.48</p>	<p style="text-align: center;">111</p> <p>1 Q And, now, there are a bunch of 2 different numbers given for the 101 zone axis; 3 right?</p> <p>4 A Correct.</p> <p>5 Q And, now, do any of them have a 6 d-spacing close to 21.2?</p> <p>7 A No.</p> <p>8 Q So how do you explain that?</p> <p>9 A Well, you know, as you look through my 10 report, I talk about the anthophyllite solid 11 solution series. So even though this says 12 anthophyllite, we know that this is iron-rich 13 anthophyllite, or it could be enough that you 14 have cummingtonite in various levels, so that all 15 changes through there.</p> <p>16 So I've got to go -- on the Su tables, 17 I think this is all just pure anthophyllite, 18 which we very rarely see, meaning no iron.</p> <p>19 Q So you think that the explanation for 20 why a d-spacing is so off is that it could be 21 anthophyllite mixed with cummingtonite?</p> <p>22 A Well, I don't know the genesis of the 23 Su tables on exactly which chemistry he's using 24 for anthophyllite. And it's been a while since 25 I've looked over these on his (h k 0), (h k l),</p>
<p style="text-align: center;">110</p> <p>1 and 5.05; right?</p> <p>2 A Correct.</p> <p>3 Q So in this instance, that's a third 4 dimension of spacing whereas -- and the ones on 5 the bottom are the other two dimensions?</p> <p>6 A It changes on the particular when 7 you're on a zone axis. I mean, it's something 8 that is routinely done like that where you 9 actually -- if you're on the zone axis, that 10 changes. So it doesn't bother me.</p> <p>11 Q And do you consider the Su tables an 12 authoritative source for comparing against zone 13 axes?</p> <p>14 A For anthophyllite? Yes. (Whereupon a document was identified as Defendant's Exhibit 14.)</p> <p>15 Q Let's mark the Su tables as 16 Exhibit 14. So this is all of them. So if you 17 want to look at anthophyllite, it's about 20 18 pages in. It starts with anthophyllite 1 of 32. 19 If you look at -- are you with me on the 20 anthophyllite part? It's around 20 pages in.</p> <p>21 A I'm getting there.</p> <p>22 Q Sorry. Are you with me?</p> <p>23 A I'm with you.</p>	<p style="text-align: center;">112</p> <p>1 so I'd have to just check on that.</p> <p>2 But I don't believe you can go -- if 3 you're -- unless you're saying it's pure -- when 4 I say pure, it's just no iron anthophyllite 5 because you can -- all these anthophyllites have 6 various concentrations of iron in them.</p> <p>7 Q And you think that would change the 8 d-spacing to that extent?</p> <p>9 A On the zone axis, yes, I believe so.</p> <p>10 Q You're familiar with the Yamate 11 methodology, correct, for SAED?</p> <p>12 A I'm familiar with George's stuff, yes.</p> <p>13 Q And do you agree with Yamate that for 14 SAED for a unique identification of a mineral, 15 you need two different near exact zone axis 16 orientations?</p> <p>17 A Yes and no.</p> <p>18 Q Let's start with the yes.</p> <p>19 A Yes if I was doing this in the 20 timeframe that Yamate was doing it back in the 21 '80s when the EDXA systems are not as 22 sophisticated as they are now and you have a 23 complete unknown. You're just looking at 24 something, and you're trying to determine what it 25 is versus having some idea of the types of</p>

<p>113</p> <p>1 minerals that are in cosmetic talcs. I may do 2 that.</p> <p>3 But if you were to talk to George 4 later on in his career when he worked for me, he 5 said that wasn't necessary because of the -- as 6 the sophistication of the EDXA systems march 7 forward, the chemistry -- being able to determine 8 the chemistry is a lot better.</p> <p>9 If you're looking at an unknown, 10 completely unknown, but if you're getting the 11 chemistry off a tremolite and you have 12 anthophyllite, then it's a question of what 13 matrix are you looking in, does it have fibrous 14 talc or not, and how do you distinguish between 15 fibrous talc and anthophyllite.</p> <p>16 So, yes, I agree at the time he wrote 17 the draft protocol he's probably right.</p> <p>18 Q And the reason you're saying it's 19 different is because you have other non-SAED 20 methods you're using at the same time. Is that 21 what you're saying?</p> <p>22 A Yes.</p> <p>23 Q So for SAED alone, would you agree 24 with that statement?</p> <p>25 A I don't know. If we were doing</p>	<p>115</p> <p>1 with a, for example, near 101 zone axis 2 determination and not an exact 101?</p> <p>3 A Correct. You have to understand, even 4 Sanchez has not challenged any of our tremolite, 5 tremolite analysis. He says we're all correct on 6 that. And I guess I would be my biggest critic, 7 so to speak. In his disagreement with the 8 anthophyllite, he's saying that we're -- you 9 know, it's cummingtonite. Well, I'm not 10 disagreeing with him. Some of these could be 11 cummingtonite.</p> <p>12 But I state in the report that is 13 the -- it is the anthophyllite solid solution 14 series that is anthophyllite with no iron, 15 anthophyllite with iron that replaces the 16 magnesium. And then as the more iron gets in 17 there, the ions are different sizes. Then it can 18 collapse into a monoclinic versus an 19 orthorhombic.</p> <p>20 And then as the iron increases, it 21 then can -- it's a dimorph, I think they call it, 22 where -- so you have a solid solution series. 23 Now, I think in recent depositions, Sanchez says 24 there is no anthophyllite solid solution series. 25 That's not consistent with the mineralogical</p>
<p>114</p> <p>1 nothing else but morphology and selected area 2 electron diffraction and was asked to make a 3 determination without any chemistry, I would 4 probably do at least one, maybe two zone axes.</p> <p>5 Q Is a zone axis SAED determination more 6 useful than a diffraction pattern taken not on a 7 zone axis?</p> <p>8 A More useful for what?</p> <p>9 Q For identifying the mineral.</p> <p>10 A If you have no other tools available, 11 yes, it would be more -- if you don't have EDXA 12 and you're just looking at TEM and the only tool 13 you have to make the identification is SAED, yes, 14 you should be doing zone axis diffraction.</p> <p>15 Q But some of the diffraction patterns 16 you take are not exactly on the zone axis; right?</p> <p>17 A Correct. It's not needed because 18 we've got EDXA to go along with this. If you go 19 to the -- I'll just point to the 22262. If you 20 go there, it says typically zone access 21 diffraction patterns aren't required. And the 22 only thing you really need to do if you're going 23 to separate out the fibrous talc is rotate the 24 goniometer, and that's what we did.</p> <p>25 Q And so that's why you are comfortable</p>	<p>116</p> <p>1 textbooks out there that talk about that.</p> <p>2 And, you know, if he said -- there 3 probably is cummingtonite in there, and 4 cummingtonite is found in the Vermont -- in 5 Vermont talc, in that whole Vermont area for 6 talc.</p> <p>7 So I'm comfortable that we have ID'd 8 this correctly. This is part of the solid 9 solution series. In this particular case, it 10 could -- it may well -- some of these may well be 11 cummingtonite. It's immaterial to me. 12 Cummingtonite-grunerite is a regulated asbestos.</p> <p>13 Q And would you agree that two 14 diffraction patterns can be taken at the same 15 zone axis orientation but on two different 16 crystal layers?</p> <p>17 A Sure.</p> <p>18 Q And so if you do that, that's not -- 19 if you look at one layer and a second layer on 20 the same -- strike that.</p> <p>21 I guess I'll put it, just because 22 there are diffraction patterns taken on two 23 different layers does not necessarily mean that 24 they are different zone axis orientations; 25 correct?</p>

<p style="text-align: center;">117</p> <p>1 A Well, you can have 101 or a 10 minus 1 2 if it's on a plane underneath. So you can get 3 two different diffraction patterns, but you're 4 going all the way through the crystal, so it's a 5 matter of the orientation to see that.</p> <p>6 Q I was going to ask you about the 7 numbering. So a zone axis is usually denoted 8 with three numbers, right? Like, for example, 9 101, we were talking about near 101 just now; is 10 that right?</p> <p>11 A Correct.</p> <p>12 Q And so is a diffraction pattern taken 13 at, say, 301 the same orientation as one taken at 14 302?</p> <p>15 A 101 and what?</p> <p>16 Q Sorry. I said 301 and 302. Are those 17 different zone axis orientations, or would that 18 be the same orientation at different layers?</p> <p>19 A 301 and 302, if we go to --</p> <p>20 MR. STUEMKE: Are we still talking 21 about anthophyllite?</p> <p>22 Q I really was trying to ask the 23 question generally about just how the notation 24 works and if the last digit reflects the layer.</p> <p>25 A The last digit is hk and l. hk and l.</p>	<p style="text-align: center;">119</p> <p>1 on the zone axis; is that right?</p> <p>2 A Correct. The random orientation as we 3 go through and take these diffraction patterns 4 sometimes land on a zone axis for a particular 5 type. And when we run the verification, it will 6 tell you -- the CrystalMaker that we use will 7 tell you that, yeah, this is on a zone axis. And 8 it says near 101, so if we go to 101 -- so we 9 have near 101. We have the zone axis 10 information. The $d(hkO)$ which on the chart is 11 8.95, this is 8.48. The $d(hkl)$ is 3.36. This 12 one is 5.05. So we're at the near. It's not 13 right on it. So the first one, the (hkO) is 14 close.</p> <p>15 Q How close do you have to be to be 16 considered -- for you to call it near a 17 particular zone axis?</p> <p>18 A I'm not sure that's defined, near. 19 Not exactly on it. As I sit here today, I'm not 20 sure what the system is calling near. It's just 21 not on a true zone axis.</p> <p>22 Q So the zone axis numbers that are 23 produced in the bottom of the page, is that 24 something that the computer is doing 25 automatically, or is that something that an</p>
<p style="text-align: center;">118</p> <p>1 Golly. I'm having a mental blockage. So you're 2 talking about 301?</p> <p>3 Q I was just using that as an example. 4 I could make the question more general if that's 5 helpful.</p> <p>6 A You know, it's been a -- I know this, 7 and it's on the tip of my tongue, so I'm going to 8 have to defer to look that up again.</p> <p>9 Q We talked about some of these. In 10 your diffraction verification, some have zone 11 axis information, and some don't. Is the 12 reason -- when they don't have a zone axis 13 information on it, is that because you never took 14 a zone axis diffraction?</p> <p>15 A Well, you're looking at a cylinder 16 laying on a flat surface, and depending on where 17 it's laying, you may get a zone axis pattern just 18 from -- just because of the orientation instead 19 of tilting it to another orientation.</p> <p>20 Q For example, on this first page, 21 there's no zone axis information.</p> <p>22 A So where we were examining it was not 23 on a zone axis.</p> <p>24 Q So if it doesn't have zone axis 25 information, that means you weren't examining it</p>	<p style="text-align: center;">120</p> <p>1 analyst is typing in?</p> <p>2 A No. It's the computer. It's 3 running -- we run CrystalMaker, and if it's near 4 that, it will print that. Now, how -- so I don't 5 know what the system is calling near.</p> <p>6 Q So it's CrystalMaker that's calling it 7 near 101?</p> <p>8 A Correct. Same system Sanchez uses.</p> <p>9 Q And on the table on the top, you have 10 a range of plus or minus five percent. What's 11 your basis for using five percent as the 12 tolerance there?</p> <p>13 A That's the standards in the 14 certifications, the protocols. I mean, that's 15 what they produce, plus or minus five percent.</p> <p>16 Q And which protocols are these?</p> <p>17 A Well, it's the NIST standards. When 18 we get audited, it has to be within plus or minus 19 five percent.</p> <p>20 Q So you're saying that this five 21 percent tolerance would be in the NIST standards?</p> <p>22 A It's in our certifications of what -- 23 I believe what -- NIST says that when we say that 24 it has a d-spacing of X that it has to be plus or 25 minus five percent within the mineral powder</p>

William E. Longo, Ph.D.

Weirick, et al. vs Brenntag North America, et al.

April 17, 2019

34 (Pages 121 to 124)

<p style="text-align: center;">121</p> <p>1 diffraction file data book.</p> <p>2 Q And these are certifications when you</p> <p>3 get audited that that's how -- that's the level</p> <p>4 of accuracy your machines have?</p> <p>5 A Well, that's the level of accuracy</p> <p>6 that we're taking the diffraction patterns. And</p> <p>7 when we're calling it, it has to fit in that</p> <p>8 range. I think that's the error rate, plus or</p> <p>9 minus five percent.</p> <p>10 Q And, now, every once in a while,</p> <p>11 there's some data missing from the zone axis</p> <p>12 information. So I can just -- it might be easier</p> <p>13 for me to show you my copy because these don't</p> <p>14 have page numbers. If you look at -- this is</p> <p>15 sample M68503-026-006. It's missing an angle</p> <p>16 number.</p> <p>17 A I can't tell you why that is.</p> <p>18 Q That was going to be my question,</p> <p>19 which is, do you know why that would be?</p> <p>20 A No. But Anthony Keeton is our</p> <p>21 mineralogist. I'll ask him when I get back.</p> <p>22 Q So does the computer produce</p> <p>23 information and somebody retypes it on this</p> <p>24 sheet, or does your software produce this on its</p> <p>25 own?</p>	<p style="text-align: center;">123</p> <p>1 Q And for some of the anthophyllite, you</p> <p>2 looked twice under SAED to confirm you weren't</p> <p>3 looking at talc; right?</p> <p>4 A Well, all of the anthophyllite in the</p> <p>5 MDL where -- and, again, they're saying</p> <p>6 anthophyllite because I didn't have them type in</p> <p>7 anthophyllite solid solution series. So this is</p> <p>8 all part of the solid solution series, and every</p> <p>9 one of them should have two diffraction patterns</p> <p>10 at different angles.</p> <p>11 Q But they're not -- I thought you just</p> <p>12 said that for none of the particles you</p> <p>13 designated anthophyllite did you take more than</p> <p>14 one zone axis orientation.</p> <p>15 A That's correct. Even though it's two</p> <p>16 orientations, it's not necessarily on a second</p> <p>17 zone axis. It's just -- if you read the 22262,</p> <p>18 it just says rotate it until you get another</p> <p>19 orientation, not necessarily a zone axis</p> <p>20 orientation, but another orientation so that the</p> <p>21 pattern changes to eliminate the possibility of</p> <p>22 fibrous talc.</p> <p>23 Q And so the reason that you did that</p> <p>24 was to confirm that you weren't looking at talc;</p> <p>25 right?</p>
<p style="text-align: center;">122</p> <p>1 A My understanding is the software</p> <p>2 produces this.</p> <p>3 Q And we've talked about the Su tables</p> <p>4 and some other standards, and those are standards</p> <p>5 for zone axis measurements; right?</p> <p>6 A Yes.</p> <p>7 Q Are you aware of any sort of standards</p> <p>8 for measurements taken at non-zone axes?</p> <p>9 A Other than the mineral powder</p> <p>10 diffraction file data book where you're -- you</p> <p>11 know, it's either zone axis or the d-spacings.</p> <p>12 I'm not aware of really anything else.</p> <p>13 Q I guess my question is: Are there</p> <p>14 published standards that have non-zone axis</p> <p>15 spacings like near 101 or something like that?</p> <p>16 A I don't believe so.</p> <p>17 Q And did you do diffraction</p> <p>18 verifications for each of the bottles in your MDL</p> <p>19 report?</p> <p>20 A Yes.</p> <p>21 Q I may have asked this, and I apologize</p> <p>22 if I already said this. But can you confirm that</p> <p>23 for no particle that you designated anthophyllite</p> <p>24 did you take more than one zone axis orientation?</p> <p>25 A That's correct.</p>	<p style="text-align: center;">124</p> <p>1 A Yes.</p> <p>2 Q And the purpose of it was not to make</p> <p>3 sure that the SAED could only uniquely correspond</p> <p>4 to anthophyllite and not any other mineral;</p> <p>5 right?</p> <p>6 A Well, the SAED corresponds to</p> <p>7 anthophyllite solid solution series and</p> <p>8 eliminates some of the potential other fibrous</p> <p>9 amphiboles in there that are not regulated</p> <p>10 asbestos. Like antigorite or sepiolite are two</p> <p>11 that just keep coming to my head.</p> <p>12 But it's not used alone. It's used</p> <p>13 with EDXA. You know, if it had aluminum in it,</p> <p>14 then you would be suspicious on the EDXA if it's</p> <p>15 high enough that it may be antigorite. So then</p> <p>16 you might do some more work on that.</p> <p>17 Q Are you aware of anyone else who's</p> <p>18 published an anthophyllite zone axis lookup table</p> <p>19 other than the Su tables?</p> <p>20 A I'm not aware of anybody.</p> <p>21 Q So for any of the particles you</p> <p>22 designated as tremolite, did you take multiple</p> <p>23 zone axis orientations of a single particle?</p> <p>24 A No. It's not necessary. Tremolite is</p> <p>25 fairly unique. You don't have to do that.</p>

<p>1 Q So for all the MDL bottles you at most 2 took only one zone axis orientation for the 3 particles you analyzed under SAED? 4 A If it happened to land near on or a 5 zone axis, that would be correct. But the 6 chemistry is fairly unique for the tremolite 7 solid solution series, tremolite actinolite, 8 winchite, richterite. 9 Q I don't know if this is a good time 10 for a break. I don't remember when we started. 11 A Can't remember. 12 MR. STUEMK: It depends on what time 13 you want to finish. 14 MR. BUSH: I think it's not going to 15 be much longer. I just don't know how long it's 16 been and whether it's sort of totally ridiculous 17 to take a break now, but I could use five minutes 18 just to make sure I've got everything covered. 19 MR. STUEMK: Sure. 20 (Proceedings in recess, 2:34 p.m. to 21 2:47 p.m.) 22 (Whereupon a document was identified 23 as Defendant's Exhibit 15.) 24 Q So what I'm going to mark as 25 Exhibit 15 is a list of your MDL samples with the</p>	<p>125</p> <p>1 back out Exhibit 5, which is the OSHA 2 regulations. And if you look at the first page, 3 it defines asbestos-containing material as 4 something with greater than one percent asbestos 5 in it; is that correct? 6 A That's correct. 7 Q And you're familiar with these 8 regulations? 9 A I'm familiar. These are for 10 asbestos-added products which typically don't 11 have less than one percent in it. And this is 12 not done by TEM. It's done by the weight percent 13 being put in the material and by polarized light 14 microscopy. 15 The TEM weight percents are highly 16 inaccurate because it's a mathematical 17 calculation because the actual formula for 18 determining the weight for -- is π times the 19 density then in paren the lengths times the 20 widths squared. 21 So it just depends on what you find. 22 If you have a sample that has single fibers or a 23 sample that has multiple bundles, it can change 24 the weight percent pretty radically. 25 Q Are you saying that the formula where</p>
<p>126</p> <p>1 percentage asbestos by weight marked out. And, 2 now, the highest concentration you found is 3 .0092 percent; correct? 4 A That's correct. 5 Q And the lowest sample where you 6 detected something was -- the asbestos percentage 7 by weight was .0000033 percent, and that's, just 8 for the record, five zeros after the decimal 9 point; correct? 10 A Correct. 11 Q That's 3.3 millionths of a percent? 12 A Correct. 13 Q So if we wanted to find the median 14 asbestos by weight in your MDL testing, we could 15 just look at the middle bottle. And so if this 16 chart is accurate, the one I've highlighted, 17 which is sample M68503-023, would be the median 18 bottle; correct? 19 A That's what it states. 20 Q And that would be -- .000017 percent 21 would be the percentage asbestos by weight of 22 your median bottle if this chart is accurate; 23 right? 24 A That is correct. 25 Q And so I want to show you -- I took</p>	<p>128</p> <p>1 you use π and the -- 2 A Density. 3 Q -- density and all the other metrics 4 of the structure that that isn't an accurate way 5 to measure the weight of the structure you're 6 looking at? 7 A The overall weight of what's in the 8 sample. And the -- these regulations don't have 9 to do with the loose powder. It has to do with 10 an actual building product in which they're 11 trying to determine it -- it's an actual product 12 that's asbestos added to it. So I see what it 13 says, one percent, but it's not applicable to 14 these types of samples. 15 Q I just want to go back to the question 16 I was asking, which is -- I'll ask it a different 17 way, which is, are you saying that the weight 18 percents aren't accurate because they're not -- 19 it's not an accurate way to extrapolate it to the 20 entire bottle from what you tested? 21 A For these types of samples, that's 22 correct. 23 Q And so why do you think you can 24 extrapolate the number of structures per gram but 25 not the weight -- the asbestos percentage by</p>

<p>129</p> <p>1 weight to the entire bottle?</p> <p>2 A Because one very large bundle equals</p> <p>3 one very thin fiber one to one where the weight</p> <p>4 of one bundle can be an order of magnitude higher</p> <p>5 than fibers, than one fiber or two fibers. So it</p> <p>6 all depends on the population of individual</p> <p>7 structures you're seeing.</p> <p>8 And if you don't have a large number</p> <p>9 of fibers and bundles that sort of can even out,</p> <p>10 the weight percents are very iffy by TEM. That's</p> <p>11 why no exposure assessments -- OSHA doesn't</p> <p>12 determine an exposure assessment based on weight</p> <p>13 percent of what's in the air. They base it on</p> <p>14 the number of structures.</p> <p>15 That's why the ISO methods talk about</p> <p>16 that a more accurate exposure assessment is the</p> <p>17 number of fibers in the air. And it's a loose</p> <p>18 powder. It's not a construction product of some</p> <p>19 sort where you have a gasket or fireproofing or</p> <p>20 acoustical plaster.</p> <p>21 So it's very -- if you look at our --</p> <p>22 if you look at the weight percent of the</p> <p>23 15,000,100 fibers/bundles per gram, the weight</p> <p>24 percent is lower than the next highest number</p> <p>25 which is 4 million.</p>	<p>131</p> <p>1 Q And what about numbers -- just fibers</p> <p>2 somebody is exposed to, not fibers per cc, but --</p> <p>3 have you ever seen exposure assessments done with</p> <p>4 just numbers of fibers? For example, someone was</p> <p>5 exposed to 5,000 fibers in this work area?</p> <p>6 A No. It's all fibers per cc, per cubic</p> <p>7 centimeter of air. It's a standard. In the old</p> <p>8 days, it was milliliters, which is the exact same</p> <p>9 thing.</p> <p>10 Q How would you go about figuring out</p> <p>11 the number of fibers somebody was exposed to if</p> <p>12 you knew the concentration of air they were</p> <p>13 exposed to, the concentration of asbestos in the</p> <p>14 air, and how long they were exposed to it?</p> <p>15 A I think we've already gone through</p> <p>16 this. I mean, I would sit down and do the</p> <p>17 calculation that I'm not going to do here because</p> <p>18 I'd like to have time to look at it and make sure</p> <p>19 I haven't made any errors or simple mistakes.</p> <p>20 Q I just want to say -- let me put it</p> <p>21 this way: If you want -- we're not going to do</p> <p>22 the calculations right now because you've said</p> <p>23 you weren't. But I just want to understand, if</p> <p>24 you were to figure it out -- you could figure out</p> <p>25 the number of fibers someone's exposed to if you</p>
<p>130</p> <p>1 Q Does that mean that the samples you're</p> <p>2 testing are not representative of the bottle as a</p> <p>3 whole?</p> <p>4 A No. If you're doing a mathematical</p> <p>5 calculation on the weight of each structure, what</p> <p>6 is more accurate is the number of fibers and</p> <p>7 bundles per gram because you're comparing one to</p> <p>8 one. One bundle equals one fiber. One large</p> <p>9 bundle still equals one very thin fiber, and</p> <p>10 squaring the width of the structure changes it</p> <p>11 drastically even if the bundle is twice the</p> <p>12 size -- if one fiber is twice the width of the</p> <p>13 second -- of another fiber.</p> <p>14 It's not an accurate way to do the</p> <p>15 count, in my opinion. And I've testified about</p> <p>16 that numbers of times. If you want me to agree</p> <p>17 that 0.000017 is less than one percent, I will</p> <p>18 agree.</p> <p>19 Q I understand that. And you talked</p> <p>20 about the number of fibers that are in the air.</p> <p>21 Is that what you're saying was a better way to do</p> <p>22 an exposure assessment?</p> <p>23 A All exposure assessments are fibers</p> <p>24 per cubic centimeter of air, not weight per cubic</p> <p>25 centimeter of air.</p>	<p>132</p> <p>1 knew the concentration of asbestos in the air and</p> <p>2 fibers per cc and the amount of time they were</p> <p>3 exposed to it; is that right?</p> <p>4 A I believe so.</p> <p>5 Q And the way you would do it is just</p> <p>6 you would figure out -- you would take some kind</p> <p>7 of inhalation rate, figure out how much they're</p> <p>8 breathing over that -- how many cc's of air</p> <p>9 they're breathing over that particular time, and</p> <p>10 multiply that by the concentration of fibers, the</p> <p>11 amount of fibers that would be in that air; is</p> <p>12 that right?</p> <p>13 A Yes. I think that's how I would do</p> <p>14 it.</p> <p>15 (Whereupon a document was identified</p> <p>16 as Defendant's Exhibit 16.)</p> <p>17 Q I've marked as Exhibit 16 another</p> <p>18 section of AHERA, which is 40 CFR 763.83. This</p> <p>19 is the definition sections. And you see this</p> <p>20 also has a definition of -- are you familiar with</p> <p>21 these regulations?</p> <p>22 A I believe so.</p> <p>23 Q And you see that asbestos-containing</p> <p>24 material here is also defined as more than one</p> <p>25 percent asbestos; correct?</p>

<p style="text-align: center;">141</p> <p>1 one at 15,000,100 per gram and the other at 2 4 million per gram. 3 Using the basis of what those 4 exposures were between the two concentrations 5 still comes to the same exposure for the bottle 6 that Mrs. Weirick was using or others -- what I 7 call her bottle that she produced. So it shows 8 very good reliability between the two data 9 points.</p> <p>10 Q And I believe that you indicated using 11 the median concentration bottle from your MDL 12 testing, which is represented to be 9,000 fibers 13 per gram, you calculated an exposure level that 14 would be experienced by using that bottle of .002 15 fibers per cc. Does that sound right?</p> <p>16 A Yes.</p> <p>17 Q Now, if we were to calculate the 18 average fibers per gram bottle, how would we go 19 about doing that?</p> <p>20 A You would -- all the positive samples, 21 you would take those and add those all up. For 22 the negative samples, it's customary -- it's 23 typically that you take one-half the sensitivity 24 or the detection limit and add it all up and 25 average it.</p>	<p style="text-align: center;">143</p> <p>1 if you were to pick a number, it's typically 1.0 2 times 10 to the minus 5. And that is the AT -- I 3 always have trouble with the initials of that. I 4 can't think of it right off the top of my head. 5 But it's 1.0 times 10 to the minus 5.</p> <p>6 Q ATSDR, the Agency for Toxic 7 Substances?</p> <p>8 A ATSDR. Thank you. Or I think it's 9 5.0 times 10 to the minus 5, something like that.</p> <p>10 Q So utilizing that number, one or five 11 times ten to the minus five, and comparing that 12 to the exposure concentrations that you 13 calculated for somebody utilizing the median 14 concentration MDL bottle and for Ms. Weirick's 15 bottle, how would you compare those 16 concentrations to background or ambient level?</p> <p>17 A Approximately two orders of magnitude 18 higher than background for that particular 19 concentration for, quote, background asbestos.</p> <p>20 Q And, actually, I think for 21 Mrs. Weirick, which is .03, would that be three 22 orders of magnitude greater?</p> <p>23 A Yes.</p> <p>24 Q Again, since all the fibers that 25 you've identified based on your methodology are</p>
<p style="text-align: center;">142</p> <p>1 And just looking at the numbers, I 2 believe taking the mean would be a more 3 appropriate concentration, that the numbers would 4 have been higher. So it would increase that 5 exposure -- the potential exposure. So I would 6 use the mean of all the analyses versus just the 7 median.</p> <p>8 MR. STUEMKE: And just for the record, 9 we may have him do that calculation in advance of 10 trial. I think he's described the methodology 11 that he's used to do it, and it's just simple 12 math. So he may present that at trial. We 13 haven't decided that yet.</p> <p>14 Q But if we do ask you to testify to 15 that at trial, would you use the methodology you 16 just described?</p> <p>17 A Yes.</p> <p>18 Q What is, in your opinion, a reasonable 19 estimation of the ambient air concentration of 20 asbestos sometimes known as a background level of 21 asbestos?</p> <p>22 A I've always testified that unless you 23 have a source, you're not going to have 24 background of the tremolite solid solution series 25 or the anthophyllite solid solutions series. But</p>	<p style="text-align: center;">144</p> <p>1 amphibole fibers, how would that compare with the 2 level of amphibole fibers present in normal 3 ambient air?</p> <p>4 A You typically do not see amphibole 5 fibers in ordinary background. If you do, it's 6 usually amosite, very rarely, if ever, 7 crocidolite or anthophyllite or tremolite unless 8 you have a source.</p> <p>9 You have to have a source in order to 10 have background concentrations. And tremolite 11 was not used as an additive in asbestos-added 12 products. And anthophyllite, there was only one 13 product that I'm aware of, a very specialty 14 chemical piping sold to industrial plants.</p> <p>15 Q And I would just note that with 16 respect to whether you've, in this deposition, 17 which is now in its third volume over the course 18 of 13 months, whether you've offered all of the 19 opinions you may offer at trial, it's fair to 20 say, and you talked about this earlier, that 21 you've testified in cases involving Johnson & 22 Johnson many times in the last year; correct?</p> <p>23 A That is correct.</p> <p>24 MR. STUEMKE: So for purposes of any 25 Kennemur objection at the trial of this case, we</p>

<p style="text-align: center;">145</p> <p>1 would point out that essentially all of 2 Dr. Longo's opinions have been fully explored in 3 this deposition. To the extent anything may not 4 have been, it's very unlikely to be an actual 5 surprise to Johnson & Johnson, and we encourage 6 them to ask any questions they may have of you at 7 this time.</p> <p>8 With that stated, I will pass the 9 witness.</p> <p>10 RE-EXAMINATION 11 BY MR. BUSH:</p> <p>12 Q I have a few questions about that. 13 We'll start with background. Someone is exposed 14 to background all -- during the course of a day, 15 someone's exposed to background 24 hours a day; 16 correct?</p> <p>17 A No. There's no -- asbestos is not 18 ambiguous in the environment. You're not being 19 exposed 24 hours a day.</p> <p>20 Q So let me ask it this way: You were 21 just asked to compare the fibers per cc of 22 background to the fibers per cc from use of a 23 bottle of Johnson & Johnson Baby Powder; correct?</p> <p>24 A Correct.</p> <p>25 Q That calculation does not take -- that</p>	<p style="text-align: center;">147</p> <p>1 hypothetical. You're talking about dose or 2 concentration?</p> <p>3 Q I am saying, in order to -- let me 4 rephrase. Do you think just comparing fibers per 5 cc concentrations without considering the amount 6 of time of that exposure is a meaningful 7 comparison?</p> <p>8 A Absolutely. If you're taking 9 background over the period of time that they're 10 using Johnson & Johnson's Baby Powder and if 11 you're accepting that it is ten to the minus 12 five, you're orders of magnitude over, quote, 13 background.</p> <p>14 And when you're over background, 15 you're adding to whatever background is. So to 16 say things like, well, those exposures are going 17 to be below background, that's crazy. Everything 18 you get exposed, quote, above background is 19 adding to the background. It's adding to what's 20 there.</p> <p>21 So you're getting exposure with a 22 product that contains asbestos fibers versus this 23 hypothetical background. So I think it's very 24 meaningful.</p> <p>25 Q And your opinion about background,</p>
<p style="text-align: center;">146</p> <p>1 comparison does not take into account the amount 2 of time someone's exposed to either metric; is 3 that correct?</p> <p>4 A That is correct.</p> <p>5 Q And you're going to be exposed to 6 whatever asbestos is in the background for much 7 longer than you would be exposed to one 8 application of baby powder; is that right?</p> <p>9 MR. STUEMKE: Assumes facts not in 10 evidence.</p> <p>11 A Well, if you're going to get that 12 detailed on it, in my opinion, there is no 13 background of tremolite, anthophyllite series or 14 tremolite series. Certainly, there could have 15 been at some point chrysotile, but it depends on 16 where you are.</p> <p>17 I mean, if you're out in Nebraska 18 somewhere, you're not getting exposed 24 hours a 19 day to background. We're not getting exposed 20 24 hours a day to any measurable background.</p> <p>21 Q But in order to make a comparison 22 between two fiber per cc levels, you would have 23 to take into account the time, correct, the time 24 of exposure; correct?</p> <p>25 MR. STUEMKE: Objection. Incomplete</p>	<p style="text-align: center;">148</p> <p>1 you're not testifying about the health effects of 2 that level; correct?</p> <p>3 A I am not.</p> <p>4 Q And my question, though, was: If 5 you're going to compare a background exposure to 6 an exposure from Johnson's Baby Powder, wouldn't 7 you have to take into account the length of time 8 of each of those exposures?</p> <p>9 A No, because the background exposure 10 is, in my mind, a hypothetical, made-up thing 11 where somebody has measured it at one point, 12 typically chrysotile asbestos, and then you're 13 comparing it to an amphibole -- regulated 14 amphibole exposure.</p> <p>15 But accepting the fact, okay, for that 16 time period of exposure, any exposure is above 17 this hypothetical background. But to go in and 18 say that, you know, that this person is 63 years 19 old. For 63 years, every day, 24 hours, they're 20 being exposed to this hypothetical background is 21 just made up.</p> <p>22 Q And so when Counsel asked you to 23 compare the fibers per cc from what we calculated 24 the fibers per cc background, how come you didn't 25 tell him that's a made-up calculation and you</p>

<p style="text-align: center;">149</p> <p>1 said, well, that's two orders of magnitude 2 higher?</p> <p>3 A It's not a made-up calculation. It's 4 a calculation they have done taking an air sample 5 some years ago where they have found some 6 chrysotile asbestos. But to sit back and say, 7 now, this is what somebody's, quote, background 8 is for their entire life and here's the fiber 9 years and this -- and that the exposures that 10 Johnson & Johnson Baby Powder even -- and if this 11 is the concentration, it's below background, it's 12 never below background. It's added to 13 background.</p> <p>14 Q And in your experience with industrial 15 hygiene, have you ever used a metric fibers per 16 cc year?</p> <p>17 A I have.</p> <p>18 Q And do you think that that is a useful 19 metric to compare dose calculations?</p> <p>20 MR. STUEMK: I'm just going to object 21 to the extent we're starting to get a little bit 22 into health effects, more of medical opinions 23 than what we're offering Dr. Longo for in this 24 case. You're free to answer the question.</p> <p>25 A I wasn't giving dose or fiber year</p>	<p style="text-align: center;">151</p> <p>1 apples, wouldn't you have to compare the length 2 of time of exposure to backgrounds to the length 3 of time someone's exposed to -- from Johnson's 4 Baby Powder?</p> <p>5 A No. I don't think that's appropriate 6 to say that this is his lifetime exposure with 7 absolutely no measurements. Any time that 8 somebody has gone and actually taken the 9 measurements or gone, is this -- this 5.0 times 10 10 to the minus 5 or it's 1.0 times 10 to the 11 minus is what we would expect this person to be 12 exposed to for their entire life.</p> <p>13 I don't think that's appropriate. I 14 was just using here's what it came out for 15 Johnson & Johnson for the period of time we 16 measured, and here is what this particular 17 background level is.</p> <p>18 Q And so if I wanted -- say somebody was 19 exposed to asbestos in their workplace and 20 there's a certain fiber per cc concentration 21 that's measured there and they're there for eight 22 hours a day. To make an apples-to-apples 23 comparison of that kind of exposure to an 24 exposure from Johnson's Baby Powder, wouldn't you 25 need to take into account that they're exposed</p>
<p style="text-align: center;">150</p> <p>1 calculations here. And when I have used it is in 2 particular cases in Texas where it is the law 3 that you have to do cumulative fiber year. And 4 typically that has to do with asbestos-added 5 construction products where somebody works in 6 industrial settings and he says, well, okay, I 7 removed gaskets 30 percent of the time. Then you 8 can do that calculation.</p> <p>9 Q So when you compared the fiber per cc 10 from an exposure of baby powder to fiber per cc 11 in background, you were not comparing 12 somebody's -- the dose somebody would be exposed 13 to from background compared to the dose somebody 14 would be exposed to from baby powder. Is that 15 fair?</p> <p>16 A I did not compare it to somebody doing 17 fiber year calculations for the entire life of 18 the person. I was comparing it to here's what 19 this background, if you're going to accept that, 20 is, and here's what the concentration is. And 21 over that time period, it's two orders or three 22 orders of magnitude higher.</p> <p>23 Q Over what time period?</p> <p>24 A During the exposure time period.</p> <p>25 Q But to make this calculation applies to</p>	<p style="text-align: center;">152</p> <p>1 to -- at their workplace for eight hours a day 2 and they're exposed to Johnson's Baby Powder for 3 a less amount of time if you wanted to compare 4 the doses of those two exposures?</p> <p>5 A Well, that's different. If you want 6 to compare to somebody who is being exposed to 7 asbestos-added products and compare it to 8 Johnson & Johnson, you can do that. I mean, I've 9 had cases in Johnson & Johnson where I've said 10 the exposures here for brushing out brakes is two 11 to three fibers per cc, and here's what the range 12 is that -- you know, so it's different than this, 13 quote, background.</p> <p>14 Q I'm just trying to get at what I think 15 is a really simple point, which is, if you're 16 going to make this comparison, you have to 17 compare the amount of time someone was exposed to 18 product A compared to the amount of time someone 19 was exposed to product B, you can't do -- for it 20 to be a meaningful dose comparison?</p> <p>21 A Well, it's a meaningful concentration 22 for the exposure period. You can't go in -- and 23 I'm, you know, I'm firm on this. You can't go in 24 to me and pick up a background level and say, 25 this is what the person has been exposed to</p>

157	159
<p>1 (Proceedings adjourned, 3:28 p.m.) 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>	<p>1 under any contract that is prohibited by 2 OCGA 15-14-37(a) and (b) or Article 7.C. of the 3 Rules and Regulations of the Board; and I am not 4 disqualified for a relationship of interest under 5 OCGA 9-11-28(c). 6 There is no contract to provide 7 reporting services between myself or any person 8 with whom I have a principal and agency 9 relationship nor any attorney at law in this 10 action, party to this action, party having a 11 financial interest in this action, or agent for 12 an attorney at law in this action, party to this 13 action, or party having a financial interest in 14 this action. Any and all financial arrangements 15 beyond my usual and customary rates have been 16 disclosed and offered to all parties. 17 This 19th day of April, 2019. 18 19</p> <p>20 <u>Jennifer D. Hamon</u> JENNIFER D. HAMON, CCR B-2287 21 Certified Court Reporter 22 23 24 25</p>
<p>158</p> <p>1 CERTIFICATE OF COURT REPORTER 2 STATE OF GEORGIA 3 COUNTY OF COBB 4 I hereby certify that the foregoing 5 deposition was reported as stated in the caption, 6 and the questions and answers thereto were 7 reduced to writing by me; 8 That the witness's right to read and 9 sign the deposition was waived; 10 That the foregoing pages 1 through 159 represent a true, correct, and complete 12 transcript of the evidence given on the 13 above-referenced date by the witness, WILLIAM E. 14 LONGO Ph.D., who was first duly sworn by me; 15 That I am not of kin or counsel to any 16 of the attorneys or parties in this case. 17 I do hereby disclose pursuant to 18 Article 10.B. of the Rules and Regulations of the 19 Board of Court Reporting of the Judicial Council 20 of Georgia that I am a Georgia Certified Court 21 Reporter; that I am an employee of Donovan 22 Reporting PC; that Donovan Reporting PC was 23 contacted by the attorney taking the deposition 24 to provide court reporting services for this 25 deposition; that I am not taking this deposition</p>	